

CLAIMS

1. A solar energy concentrator comprising:
a membrane reflector shaped to have a substantially parabolic cross-section and having a unitary line focus; and
a transparent tubular housing enclosing said reflector.
2. The concentrator recited in claim 1 wherein said reflector is shaped by a plurality of strings extending within said tubular housing.
3. The concentrator recited in claim 2 wherein said strings are in a state of tension.
4. The concentrator recited in claim 1 wherein said reflector is shaped by a plurality of string pairs, each such pair having a string on front and back surfaces of said reflector.

5. The concentrator recited in claim 4 wherein said string pairs are in a state of tension.

6. The concentrator recited in claim 1 wherein said housing is internally pressurized above external atmospheric pressure by a gas within said housing.

7. The concentrator recited in claim 1 wherein said reflector is shaped by constrained elongated fibers intimate with said reflector and said fibers are subjected to tension to constrain said reflector in said parabolic cross-section.

8. The concentrator recited in claim 7 wherein a gas inside said housing is under pressure and wherein said pressure at least partially contributes to said tension of said fibers.

9. The concentrator recited in claim 1 wherein said housing comprises opposed endplates, a gas in said housing being pressurized to cause said endplates to be extended further from one another; and

wherein said reflector is shaped by a plurality of string pairs, each
5 said pair supporting said reflector on front and back surfaces of said reflector,
said string pairs being connected to said endplates and being subjected to
tension depending on the separation between said endplates.

10. The concentrator recited in claim 2 wherein said reflector comprises
metallized Mylar and wherein said strings comprise carbon fiber.

11. The concentrator recited in claim 1 further comprising a solar
energy receiver extending along at least a portion of said line focus.

12. The concentrator recited in claim 1 further comprising means for
rotating said housing to control the orientation of said reflector relative to incident
sunlight.

13. The concentrator recited in claim 2 wherein said strings and said
reflector intersect.

14. The concentrator recited in claim 2 wherein said strings are integral to said reflector.

15. The concentrator recited in claim 2 wherein said strings are formed within sleeves on the back side of said reflector.

16. The concentrator recited in claim 2 wherein said membrane reflector is slidably received by said strings without any significant tension being applied to said membrane reflector.

17. The concentrator recited in claim 9 wherein said endplates each comprise an axially flexible material.

18. A solar energy concentrator comprising a parabolic trough having a reflector shaped by a plurality of tensioned string pairs extending along said trough, each said pair having respective strings positioned on opposed surfaces of said reflector.

19. The concentrator recited in claim 18 further comprising a gas-tight tubular transparent housing enclosing said reflector.

20. The concentrator recited in claim 18 wherein said reflector comprises a film having a reflective surface and wherein said film is received between said pairs of strings without any significant tension being applied to said film.

21. The concentrator recited in claim 19 wherein said housing is hermetically sealed by a pair of opposed endplates, each such endplate comprising an axially flexible material.

22. The concentrator recited in claim 19 wherein a gas inside said housing is pressurized above external atmospheric pressure.

23. The concentrator recited in claim 19 wherein a gas inside said housing is under pressure and wherein said pressure at least partially contributes to said tension of said fibers.

24. The concentrator recited in claim 18 wherein said reflector comprises metallized Mylar and wherein said strings comprise carbon fiber.

25. The concentrator recited in claim 19 further comprising means for rotating said concentrator to control the orientation of said reflector and receiver relative to incident sunlight.

26. A solar energy concentrator comprising:
a tubular housing having opposed ends;
a pair of opposed endplates sealing said housing; and;
a parabolic contoured reflective surface extending within said
5 housing; said endplates having a convoluted circumferential edge, said tubular housing being hermetically secured at said ends in compression against said edge.

27. The solar concentrator recited in claim 26 further comprising a ring assembly having a plurality of shoes and a clamp for compressing said ends of said housing against said convoluted edges of said endplates.